# Exhibit 2

## <u>U.S. Patent No. 7,159,766 ("'766 Patent")</u>

#### **Accused Products**

Samsung products implementing Android Doze, including without limitation the Samsung Galaxy S20 ("Accused Products") infringe at least Claims 1, 14, 45, and 57 of the '766 Patent.

Claim 1	Accused Products
[1pre] A system, comprising:	To the extent the preamble is limiting, each Accused Product comprises the claimed system.
	For example, the Galaxy S20 is a mobile phone comprising a processor, a Wi-Fi device, and internal storage containing the Android 10 operating system. The Android operating system contains functionality for the Android "Doze" feature.
	See discussion of claim limitations below.
[1a] a processor;	Each Accused Product includes a processor.
	For example, the Galaxy S20 includes a "64-bit Octa-Core Processor."
	See, e.g.:
	AP 7nm 64-bit Octa-Core Processor * 2.76llz (Maximum Clock Speed) + 2.56llz + 26llz 7nm 64-bit Octa-Core Processor * 2.86llz (Maximum Clock Speed) + 2.46llz + 1.86llz
	*May differ by country and carrier.
	Screenshot, showing processor, from <a href="https://www.samsung.com/us/mobile/galaxy-s20-5g/specs/">https://www.samsung.com/us/mobile/galaxy-s20-5g/specs/</a>
[1b] a host controller coupled to the	Each Accused Product includes a host controller coupled to the processor.
processor; and	For example, the Galaxy S20 includes one or more bus controllers connecting the processor to the Wi-Fi device.

Claim 1		Accused Products
	See, e.g.:	
	АР	7nm 64-bit Octa-Core Processor * 2.7GHz (Maximum Clock Speed) + 2.5GHz + 2GHz 7nm 64-bit Octa-Core Processor * 2.8GHz (Maximum Clock Speed) + 2.4GHz + 1.8GHz
		*May differ by country and carrier.
	Wi-Fi	
	Wi-Fi 802.11	a/b/g/n/ac/ax 2.4G+5GHz, HE80, MIMO, 1024-QAM
	Up to 1.2Gbp	s Download / Up to 1.2Gbps Upload
		ng Wi-Fi device and processor, from nng.com/us/mobile/galaxy-s20-5g/specs/
[1c] a device coupled to the host	Each Accused Prod	duct includes a device coupled to the host controller.
controller;	For example, the G	alaxy S20 includes a Wi-Fi device.
	See, e.g.:	

Claim 1	Accused Products
	Wi-Fi
	Wi-Fi 802.11 a/b/g/n/ac/ax 2.4G+5GHz, HE80, MIMO, 1024-QAM
	Up to 1.2Gbps Download / Up to 1.2Gbps Upload
	Screenshot, showing Wi-Fi device, from <a href="https://www.samsung.com/us/mobile/galaxy-s20-5g/specs/">https://www.samsung.com/us/mobile/galaxy-s20-5g/specs/</a>
[1d] wherein the device is electrically disconnected from the host controller if	In each Accused Product, the device is electrically disconnected from the host controller if the device is not in an active state.
the device is not in an active state; and	For example, the Galaxy S20 contains the Android 10 operating system, which contains the Doze feature. The Doze feature determines that the Galaxy S20 is in a Doze state when it determines that "the [Galaxy S20] is unused for long periods of time," for example when the screen is not on, the Galaxy S20 is unplugged, and it has not moved recently.
	For another example, the Doze feature of Android 10 causes the Wi-Fi device to disconnect from the network and to cease scanning for Wi-Fi networks when the Galaxy S20 enters Doze mode. This puts the Wi-Fi device into an inactive state and causes it to cease sending network communications to the processor via the host controller.
	See, e.g.:

Claim 1	Accused Products
	Doze restrictions
	The following restrictions apply to your apps while in Doze:
	Network access is suspended.
	The system ignores wake locks.
	<ul> <li>Standard AlarmManager alarms (including setExact() and setWindow()) are deferred to the next maintenance window.</li> </ul>
	<ul> <li>If you need to set alarms that fire while in Doze, use setAndAllowWhileIdle() or setExactAndAllowWhileIdle().</li> </ul>
	<ul> <li>Alarms set with setAlarmClock() continue to fire normally — the system exits Doze shortly before those alarms fire.</li> </ul>
	The system does not perform Wi-Fi scans.
	The system does not allow sync adapters to run.
	The system does not allow JobScheduler to run.
	Excerpt, describing Doze functionality, from <a href="https://developer.android.com/training/monitoring-device-state/doze-standby">https://developer.android.com/training/monitoring-device-state/doze-standby</a>

Claim 1		Accu	sed Products
	Action	Doze	Lightweight Doze
	Trigger	Screen off, on battery, stationary	Screen off, on battery (unplugged)
	Timing	Successively increasing periods with maintenance	Repeated N-minute periods with maintenance windows
	Restrictions	No network access, wake lock, or GPS/Wi-Fi scan; alarms and jobs/syncs deferred	No network access; jobs/syncs deferred except during maintenance windows
	Behavior	Only high-priority push notification messages received	All real-time messages (instant messages, calls, etc.) received; high-priority push notification message enables temporary network access
	Exit	Motion, screen on, or alarm clock alarm	Screen on
	https://sourc	cribing Doze functionality, for e.android.com/devices/tech/	
	-	elementations include features to xtend the features that are includ	improve device power management that are included led in AOSP, they:
	wakeu		SP implementation for the triggering, maintenance, al system settings of App Standby and Doze power-
	• [C-1-4]	MUST implement App Standby B	suckets and Doze as described in Power Management.
	-	scribing Doze functionality, e.android.com/compatibility	

Claim 1	Accused Products
	Optimize for Doze and App Standby
	Starting from Android 6.0 (API level 23), Android introduces two power-saving features that extend battery life for users by managing how apps behave when a device is not connected to a power source. Doze reduces battery consumption by deferring background CPU and network activity for apps when the device is unused for long periods of time. App Standby defers background network activity for apps with which the user has not recently interacted.
	Excerpt, describing Doze functionality, from <a href="https://developer.android.com/training/monitoring-device-state/doze-standby">https://developer.android.com/training/monitoring-device-state/doze-standby</a>

#### Understanding Doze

If a user leaves a device unplugged and stationary for a period of time, with the screen off, the device enters Doze mode. In Doze mode, the system attempts to conserve battery by restricting apps' access to network and CPU-intensive services. It also prevents apps from accessing the network and defers their jobs, syncs, and standard alarms.

Periodically, the system exits Doze for a brief time to let apps complete their deferred activities. During this *maintenance window*, the system runs all pending syncs, jobs, and alarms, and lets apps access the network.



**Figure 1.** Doze provides a recurring maintenance window for apps to use the network and handle pending activities.

At the conclusion of each maintenance window, the system again enters Doze, suspending network access and deferring jobs, syncs, and alarms. Over time, the system schedules maintenance windows less and less frequently, helping to reduce battery consumption in cases of longer-term inactivity when the device is not connected to a charger.

As soon as the user wakes the device by moving it, turning on the screen, or connecting a charger, the system exits Doze and all apps return to normal activity.

Excerpt, describing Doze functionality, from <a href="https://developer.android.com/training/monitoring-device-state/doze-standby">https://developer.android.com/training/monitoring-device-state/doze-standby</a>

Claim 1	Accused Products
	Platform Power Management
	To improve device battery life, Android can affect the device state by monitoring device use and wakefulness. The platform can enter a state of sleep to pause activities from running while the device is unused.
	Doze
	Doze extends battery life by deferring app background CPU and network activity when a device is unused for long periods.
	Idle devices in Doze periodically enter a maintenance window, during which apps can complete pending work (syncs, jobs, etc.). Doze then resumes sleep for a longer period of time, followed by another maintenance window. The platform continues the Doze sleep/maintenance sequence, increasing the length of idle each time, until a maximum of a few hours of sleep time is reached. At all times, a device in Doze remains aware of motion and immediately leaves Doze if motion is detected.
	Android 7.0 and higher extends Doze to trigger a lighter set of optimizations every time a user turns off the device screen, even when the user continues to move around, enabling longer-lasting battery life.
	Excerpt, describing Doze functionality, from <a href="https://source.android.com/devices/tech/power/platform_mgmt">https://source.android.com/devices/tech/power/platform_mgmt</a>

Claim 1	Accused Products
	Doze lifecycle
	Doze begins when the platform detects that the device is idle and ends when one or more exit criteria activities occur.
	Detection
	The platform detects that a device is idle when:
	Device is stationary (using SMD).
	Device screen is off for some amount of time.
	Doze mode doesn't engage while a battery-powered device is plugged into a power charger.
	Excerpt, describing Doze functionality, from <a href="https://source.android.com/devices/tech/power/platform_mgmt">https://source.android.com/devices/tech/power/platform_mgmt</a>
	Screen Off Doze (lightweight) Doze Maintenance stationary Window
	Device becomes N minutes (device continues to be stationary with screen off
	Figure 1. Doze modes for nonstationary and stationary devices
	Excerpt, describing Doze functionality, from <a href="https://source.android.com/devices/tech/power/platform_mgmt">https://source.android.com/devices/tech/power/platform_mgmt</a>

Claim 1	Accused Products
[1e] wherein the device being electrically disconnected from the host controller causes an appearance to the host controller that the device is not coupled to the host controller; and	In each Accused Product, the device being electrically disconnected from the host controller causes an appearance to the host controller that the device is not coupled to the host controller.  For example, when the Galaxy S20 is in Doze mode, the disconnection or suspension of Wi-Fi connection and scanning causes an appearance to host controller that the Wi-Fi device is not coupled to the host controller. For example, the Wi-Fi device enters an inactive state.
[1f] wherein a sideband signal is used to signal the device to electrically reconnect after the device has been electrically disconnected.	In each Accused Product, a sideband signal is used to signal the device to electrically reconnect after the device has been electrically disconnected.  For example, when the Galaxy S20 is in Doze mode and determines that it must leave Doze mode, for example due to a maintenance window or because movement has been detected, it sends a signal to the Wi-Fi device to electrically reconnect.  See, e.g.:

## Understanding Doze

If a user leaves a device unplugged and stationary for a period of time, with the screen off, the device enters Doze mode. In Doze mode, the system attempts to conserve battery by restricting apps' access to network and CPU-intensive services. It also prevents apps from accessing the network and defers their jobs, syncs, and standard alarms.

Periodically, the system exits Doze for a brief time to let apps complete their deferred activities. During this *maintenance window*, the system runs all pending syncs, jobs, and alarms, and lets apps access the network.



**Figure 1.** Doze provides a recurring maintenance window for apps to use the network and handle pending activities.

At the conclusion of each maintenance window, the system again enters Doze, suspending network access and deferring jobs, syncs, and alarms. Over time, the system schedules maintenance windows less and less frequently, helping to reduce battery consumption in cases of longer-term inactivity when the device is not connected to a charger.

As soon as the user wakes the device by moving it, turning on the screen, or connecting a charger, the system exits Doze and all apps return to normal activity.

Excerpt, describing Doze functionality, from <a href="https://developer.android.com/training/monitoring-device-state/doze-standby">https://developer.android.com/training/monitoring-device-state/doze-standby</a>

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	Screen Off Doze (lightweight) Doze Maintenance stationary Window
	Device becomes stationary With screen off
	Figure 1. Doze modes for nonstationary and stationary devices  Excerpt, describing Doze functionality, from <a href="https://source.android.com/devices/tech/power/platform_mgmt">https://source.android.com/devices/tech/power/platform_mgmt</a>

Claim 14	Accused Products
[14pre] A method, comprising:	To the extent the preamble is limiting, each Accused Product performs the claimed method.
	See supra claim element [1pre].
[14a] detecting whether a device coupled to a host controller is in an active state;	Each Accused Product performs detecting whether a device coupled to a host controller is in an active state.
	For example, the device is detected to be in an active state when the system is not in Doze mode.
	See, e.g.:

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Claim 14	Accused Products
	Doze restrictions
	The following restrictions apply to your apps while in Doze:
	Network access is suspended.
	The system ignores wake locks.
	<ul> <li>Standard AlarmManager alarms (including setExact() and setWindow()) are deferred to the next maintenance window.</li> </ul>
	<ul> <li>If you need to set alarms that fire while in Doze, use setAndAllowWhileIdle() or setExactAndAllowWhileIdle().</li> </ul>
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Claim 14		Accu	sed Products
	Action	Doze	Lightweight Doze
	Trigger	Screen off, on battery, stationary	Screen off, on battery (unplugged)
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	Restrictions	No network access, wake lock, or GPS/Wi-Fi scan; alarms and jobs/syncs deferred	No network access; jobs/syncs deferred except during maintenance windows
	Behavior	Only high-priority push notification messages received	All real-time messages (instant messages, calls, etc.) received; high-priority push notification message enables temporary network access
	Exit	Motion, screen on, or alarm clock alarm	Screen on
	https://sourc	cribing Doze functionality, for e.android.com/devices/tech/	
	If device implementations include features to improve device power management that are included in AOSP or extend the features that are included in AOSP, they:		
	wakeu		P implementation for the triggering, maintenance, all system settings of App Standby and Doze power-
	• [C-1-4]	MUST implement App Standby B	uckets and Doze as described in Power Management.
		scribing Doze functionality, e.android.com/compatibility	

Claim 14	Accused Products
	Optimize for Doze and App Standby
	Starting from Android 6.0 (API level 23), Android introduces two power-saving features that extend battery life for users by managing how apps behave when a device is not connected to a power source. Doze reduces battery consumption by deferring background CPU and network activity for apps when the device is unused for long periods of time. App Standby defers background network activity for apps with which the user has not recently interacted.
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Periodically, the system exits Doze for a brief time to let apps complete their deferred activities. During this *maintenance window*, the system runs all pending syncs, jobs, and alarms, and lets apps access the network.



**Figure 1.** Doze provides a recurring maintenance window for apps to use the network and handle pending activities.

At the conclusion of each maintenance window, the system again enters Doze, suspending network access and deferring jobs, syncs, and alarms. Over time, the system schedules maintenance windows less and less frequently, helping to reduce battery consumption in cases of longer-term inactivity when the device is not connected to a charger.

As soon as the user wakes the device by moving it, turning on the screen, or connecting a charger, the system exits Doze and all apps return to normal activity.

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Claim 14	Accused Products
	Platform Power Management
	To improve device battery life, Android can affect the device state by monitoring device use and wakefulness. The platform can enter a state of sleep to pause activities from running while the device is unused.
	Doze
	Doze extends battery life by deferring app background CPU and network activity when a device is unused for long periods.
	Idle devices in Doze periodically enter a maintenance window, during which apps can complete pending work (syncs, jobs, etc.). Doze then resumes sleep for a longer period of time, followed by another maintenance window. The platform continues the Doze sleep/maintenance sequence, increasing the length of idle each time, until a maximum of a few hours of sleep time is reached. At all times, a device in Doze remains aware of motion and immediately leaves Doze if motion is detected.
	Android 7.0 and higher extends Doze to trigger a lighter set of optimizations every time a user turns off the device screen, even when the user continues to move around, enabling longer-lasting battery life.
	Excerpt, describing Doze functionality, from <a href="https://source.android.com/devices/tech/power/platform_mgmt">https://source.android.com/devices/tech/power/platform_mgmt</a>

Claim 14	Accused Products
	Doze lifecycle
	Doze begins when the platform detects that the device is idle and ends when one or more exit criteria activities occur.
	Detection
	The platform detects that a device is idle when:
	Device is stationary (using SMD).
	Device screen is off for some amount of time.
	Doze mode doesn't engage while a battery-powered device is plugged into a power charger.
	Excerpt, describing Doze functionality, from <a href="https://source.android.com/devices/tech/power/platform_mgmt">https://source.android.com/devices/tech/power/platform_mgmt</a>
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Claim 14	Accused Products
[14b] if the device is not in an active state, electrically disconnecting the device from a host controller, wherein electrically disconnecting the device from the host controller causes an appearance to the host controller that the device is not coupled to the host controller;	Each Accused Product performs if the device is not in an active state, electrically disconnecting the device from a host controller, wherein electrically disconnecting the device from the host controller causes an appearance to the host controller that the device is not coupled to the host controller.  See supra claim elements [1d] and [1e].
[14c] if the device is in an active state, maintaining an electrical connection between the device and the host controller; and	Each Accused Product performs if the device is in an active state, maintaining an electrical connection between the device and the host controller.  For example, when the system is not in Modern Standby idle mode, the system does not electrically disconnect the device from the host controller.  See supra claim element [1d].
[14d] electrically reconnecting the device using a sideband signal after the device has been electrically disconnected.	Each Accused Product performs electrically reconnecting the device using a sideband signal after the device has been electrically disconnected.  See supra claim element [1f].

Claim 45	Accused Products
[45pre] A computer accessible memory medium that stores program instructions, wherein the program instructions are executable by a processor to:	Each Accused Product includes a computer accessible memory medium that stores program instructions, wherein the program instructions are executable by a processor to perform the claimed steps.  See supra claim element [1pre].
[45a] detect whether a device coupled to a host controller is in an active state;	Each Accused Product contains program instructions executable to detect whether a device coupled to a host controller is in an active state.

Claim 45	Accused Products
	See supra claim element [14a].
[45b] if the device is not in an active state, electrically disconnect the device from a host controller, wherein electrically disconnecting the device from the host controller causes an appearance to the host controller that a device is not coupled to the host controller; and	Each Accused Product contains program instructions executable to if the device is not in an active state, electrically disconnect the device from a host controller, wherein electrically disconnecting the device from the host controller causes an appearance to the host controller that a device is not coupled to the host controller.  See supra claim elements [1d] and [1e].
[45c] if the device is in an active state, maintain an electrical connection between the device and the host controller; and	Each Accused Product contains program instructions executable to if the device is in an active state, maintain an electrical connection between the device and the host controller.  See supra claim element [14c].
[45d] electrically reconnect the device using a sideband signal after the device has been electrically disconnected.	Each Accused Product contains program instructions executable to electrically reconnect the device using a sideband signal after the device has been electrically disconnected.  See supra claim element [1f].

Claim 57	Accused Products
[57pre] A system, comprising:	To the extent the preamble is limiting, each Accused Product comprises the claimed system.
	See supra claim element [1pre].
[57a] a processor;	Each Accused Product includes a processor.

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Claim 57	Accused Products
	See supra claim element [1a].
[57b] a host controller coupled to the processor; and	Each Accused Product comprises a host controller coupled to the processor.  See supra claim element [1b].
[57c] a device coupled to the host controller;	Each Accused Product includes a device coupled to the host controller.  See supra claim element [1c].
[57d] wherein the device is electrically disconnected from the host controller if the device is not in an active state; and	In each Accused Product, the device is electrically disconnected from the host controller if the device is not in an active state.  See supra claim element [1d].
[57e] wherein a sideband signal is used to signal the device to electrically reconnect after the device has been electrically disconnected.	In each Accused Product, a sideband signal is used to signal the device to electrically reconnect after the device has been electrically disconnected.  See supra claim element [1f].